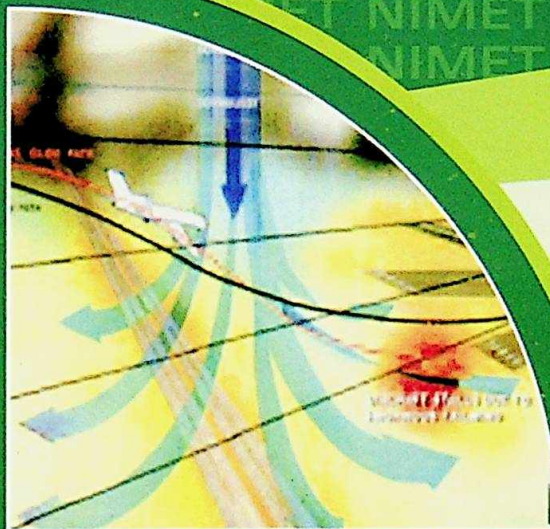




NIGERIAN METEOROLOGICAL AGENCY (NIMET) 2012

SEASONAL RAINFALL PREDICTION & SOCIO-ECONOMIC IMPLICATIONS FOR NIGERIA



NIMET

*.....Providing Weather, Climate and Water Information for
Sustainable Development and Safety.....*

NIMET
January 2012

FOREWORD

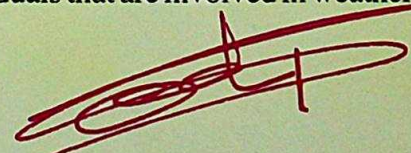
Global warming and climate change have become important contemporary issues in every country. These phenomena constitute a challenge to socio-economic development programmes of Governments all over the world; especially for those economic sectors such as *agriculture, air, land and sea transportation, construction, hydro-electric power generation*, etc, that are either dependent on, or sensitive to, weather and climate variability. In Nigeria, some of the key elements of *Mr. President's Transformation Agenda* are sensitive to weather and climate. In particular, agriculture/food security, power generation and distribution, infrastructure development and environmental management, are vulnerable to weather. Of all the weather variables, rainfall probably has the most profound impact on these critical sectors of the economy. While adequate and normal rainfall pattern is desirable, excess or deficiency of it is a hazard that must be managed in order to mitigate the negative impact on project implementation in these key economic sectors. Prior information of expected rainfall pattern is therefore valuable for *planning, decision-making* and *execution* of socio-economic development projects. The Seasonal Rainfall Prediction produced by the Nigerian Meteorological Agency (NIMET) provides such information for Nigeria.

The production and issuance of the *Seasonal Rainfall Prediction (SRP) for Nigeria* is undertaken by NIMET, a Parastatal under my Ministry, in fulfilment of the Agency's mandate of advising the Government on all matters relating to weather and climate. The SRP is now widely patronized by stakeholders in climate-sensitive sectors of the economy, and the scientific information it contains is applied for planning and decision-making.

It would be recalled that in 2011, different parts of Nigeria experienced incidents of flooding that resulted in loss of lives and property, as earlier predicted by NIMET when it released the 2011 SRP in February that year. The early warning about high prospects of flooding in some parts of the country in the 2011 SRP greatly assisted planners to put in place mitigation strategies that reduced the adverse impacts when these floods occurred. The feedback received by NIMET from across the country shows that Governments and non-governmental organizations and other stakeholders were satisfied with the Agency's effort in producing the SRP. For instance reports from the Annual Agricultural Performance Survey, conducted by the *National Agricultural Extension and Research Liaison Services (NAERLS)*, Ahmadu Bello University Zaria, and other government agencies confirmed NIMET forecast of increase in food production in 2011 compared to 2010. Also, the *Famine Early Warning Systems Network (FEWS-NET)*, a *USAID* project in their November 2011 Report, stated that there was nationwide increase in food production resulting in minimal food insecurity. This was in agreement with NIMET's 2011 SRP. A number of State Governments made reference to NIMET's prediction in their contingency plans against flooding in 2011 rainy season.

The SRP is also useful in aviation safety. Thunderstorms, which are hazardous to *aircraft* operations are associated with the rainy season. Guided by its predicted rainfall pattern, NIMET kept very close watch on occurrence of thunderstorms and issued necessary advisory to pilots. This obviously contributed to safety in the industry in 2011. *NIMET observed that in 2011, the frequency of occurrences of thunderstorms at Lagos and Abuja were higher than the 10-year averages for the two locations.*

The 2012 Edition of Seasonal Rainfall Prediction covers over 100 cities in Nigeria, thus bringing the forecast nearer to more Nigerians. There is therefore no doubt that the information contained in this publication will contribute positively to activities in various economic sectors in Nigeria. I therefore recommend it for planning and decision making, to MDAs, NGOs and other Organizations, as well as individuals that are involved in weather and climate-sensitive activities.



Princess Stella Adaeze Oduah, OON
Honourable Minister of Aviation
January 2012

EXECUTIVE SUMMARY

The Nigerian Meteorological Agency (NIMET) has produced the 2012 edition of Seasonal Rainfall Prediction (SRP) in line with the Agency's mandate of providing timely and accurate weather and climate information for different sectors of the economy that are climate-sensitive. The SRP is a vital weather advisory and early warning tool for planners, decision-makers and operators of the various rainfall-sensitive socio-economic sectors as it enhances preparedness against climate risks and associated hazards.

As in previous editions, the prediction was based on the strong tele-connection between El-Nino/Southern Oscillations (ENSO), Sea Surface Temperature (SST) anomalies and rain-bearing systems over Nigeria. In 2011, initial SRP was predicated under the La-Niña phase and later revised to the neutral phase of the ENSO phenomenon. Similarly this year, the initial weak La-Niña phase emerged but it is likely to be replaced by a strong ENSO-neutral condition from March 2012 onwards. There is virtually no chance for the development of El-Niño conditions. Therefore, ENSO-neutral conditions are the most likely dominating climate scenario during the 2012 growing season. The ENSO-neutral phase is usually noted for normal weather and climate conditions in most parts of the country.

The 2012 Rainfall Prediction also utilized mechanistic daily-time step crop models of maize, and millet tailored specifically to Nigerian conditions in the calculation of crop-specific onset, cessation and length of growing season in its region of dominance. Historical daily weather data from 38 synoptic stations spatially distributed over Nigeria and 20 ENSO-neutral years were used for these analyses. The weather data used for this analysis was updated up to 2010 for most of the 38-stations used for the 2012 SRP.

Overall there is likely to be a normal onset of rains in 2012 in most parts of the country. Onset dates between late February (in the southernmost part of the country) and last week of June (in the northernmost part of the country) are predicted. A near normal annual rainfall amount is predicted; varying from 300 to 1100mm in the northern half of the country and from 1200 to 2700mm in the south.

The forecast cessation period based on a daily analysis of soil water balance calculated using appropriate crop model that has a threshold of 50% available water content of the root zone at maturity is predicted to be spread over the country during October and November. The predicted length of growing season will vary from 90-270 days, with most of the country experiencing a normal growing season.

The summary of the 2012 SRP in terms of Agro-Ecological zones is shown on the table below

AGRO ECOLOGICAL ZONES	PLACES COVERED	ONSET DATES	CESSATION DATES	LENGTH OF GROWING SEASON (Days)	SEASONAL RAINFALL AMOUNT (mm)
Swamp Forest	Lagos, Yenagoa, P/Harcourt, Eket, Calabar, etc.	24 Feb - 30 March	4 - 11 Nov.	227-266	1200 - 2700
Tropical Rain Forest	Ijebu-Ode, Akure, Ondo, Oshogbo, Benin, Ikom, Owerri, Warri, etc.	7 Mar - 3 Apr	3 - 16 Nov	220 - 247	1200 - 2700
Guinea Savannah	Ilorin, Lokoja, Minna, Bida, Makurdi, FCT, Ibi, Shaki, Enugu, etc.	23 Mar - 2 Jun	5 - 12 Nov	163 - 233	900 - 1700
Sudan Savannah	Bguchi, Yola, Gombe, Kano, Kaduna, Zaria, Jos, etc.	9 May - 10 Jun	16 Oct - 7 Nov	129 - 183	800 - 1100
Sahel Savannah	Maiduguri, Sokoto, Gusau, Nguru, Potiskum, Katsina, etc.	15 Jun - 30 Jun	3 - 22 Oct	93 - 150	300 - 800

In addition to the usual information on rainfall, the 2012 SRP also contains temperature forecast for the first 4-months of the year; the nights (minimum) and days (maximum) temperature are expected to be generally colder to normal. Both parameters would be colder than normal in February over southern half of the country implying that the harmattan may be more pronounced thus leading to cold conditions during the period. This pattern is likely to reverse during March and April.

The implication of the prediction for some key socio-economic sectors was also considered. The Agricultural Sector is likely to witness a good season of agricultural yields and adequate fodder for livestock provided that the forecast recommendations are put into practice. We believe that the expected length of the growing season and annual rainfall amount would be adequate to support high quantity and quality of meat and milk production. For the savannah region, rainfall will be substantial enough to give high agricultural yields of crops while the predicted adequate rainfall over the south will be sufficient for a good yield of both cereal and root crops. In view of this forecast, adequate storage provisions should be made to take care of excess yields.

For the Hydrological and Water Resources sector, this implies adequate water and stream-flows which may affect the dam storages for municipal water supply, hydropower generation and irrigation. Hence, development and regular maintenance of dams for dry Season Irrigation and water supply should be accorded high priority. However, episodic flooding and erosion in the coastal zone and river catchment areas may be inevitable and as such adequate publicity is highly recommended in order to reduce damages and risk of losses of life and property, especially in areas prone to river bank overflows.

In the coastal and maritime sector, there is a high prospect of adequate fish production following the prediction of normal rainfall this year. As expected during the onset and cessation period of the rainy season, rainstorms accompanied by strong winds are expected over the country. The likely increase in frequency and intensity of these extreme weather events in the coastal areas will cause flooding and erosion which may result in landslide and loss of lives and properties. Hence, there is need for sensitization of NEMA and other relevant agencies to ensure adequate emergency preparedness for associated risks.

During the month of February when low temperatures are predicted, the Health Sector is likely to experience low occurrence of meningitis.

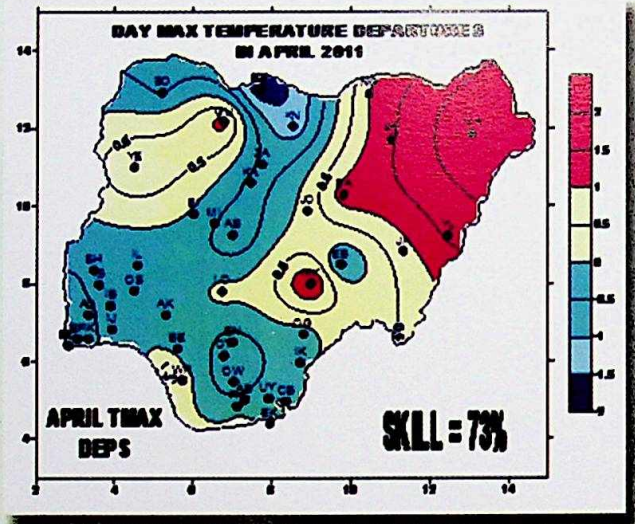
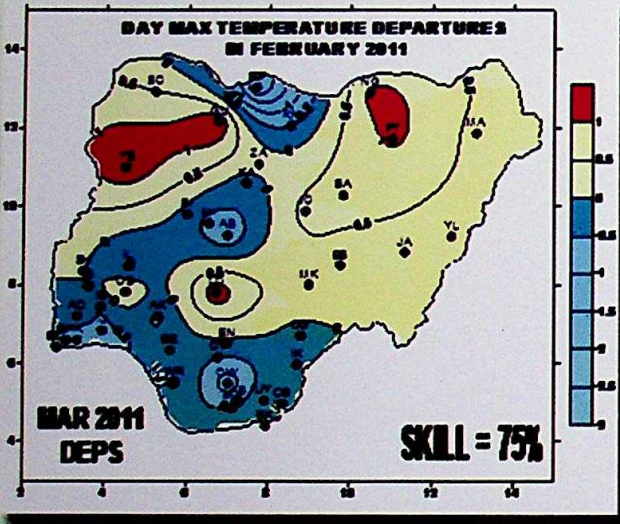
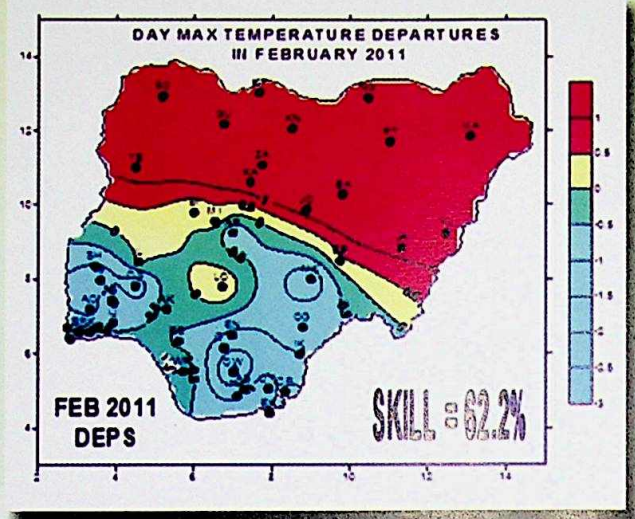
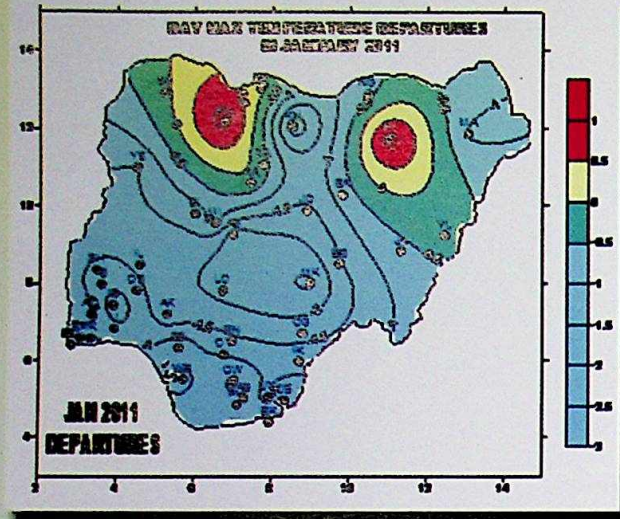
In addition to the above, the various state governments are advised to;

- a) Ensure that credit facilities are made available to the farmers in good time
- b) Provide improved high yielding seeds and seedlings to farmers
- c) Provide adequate agro-chemical additives/farm inputs
- d) Provide fertilizer and educate farmers on how to apply it correctly
- e) Create a viable environment for the farmers to market excess produce as a result of lower than normal risk
- f) Encourage irrigation if there is water shortage
- g) Reinforce the ability to stock-up Federal and States' Grain Reserves facilities in the event of food surplus following the predicted good yields
- h) Encourage an innovative Livestock feed production by harvesting and adopting biotechnological preservation of fodder for reducing communal clashes between farmers and cattle herders

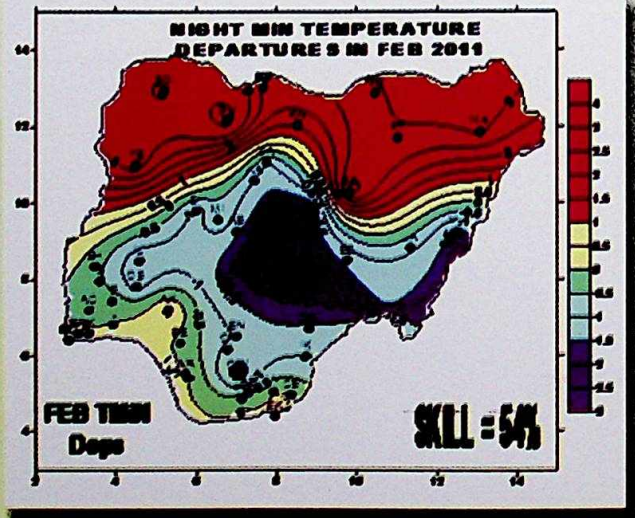
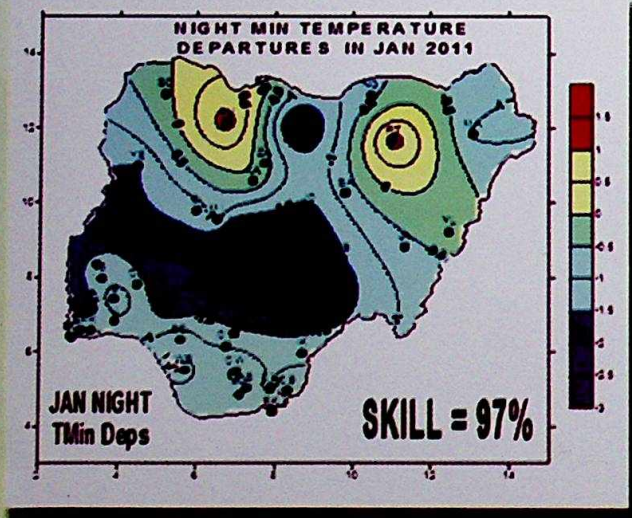
REVIEW OF 2011 SEASONAL RAINFALL PREDICTION

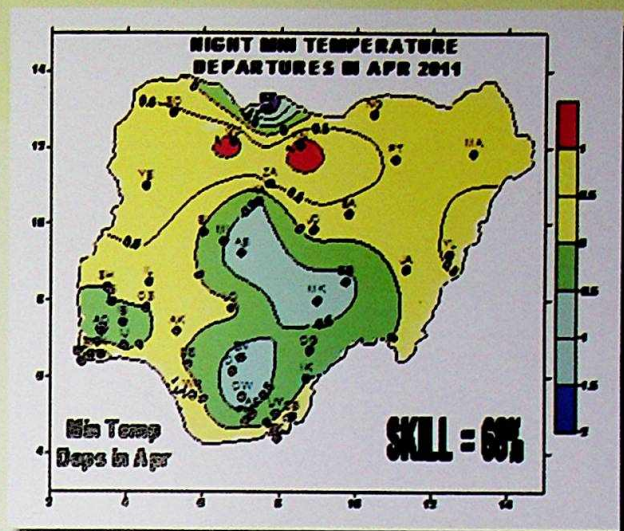
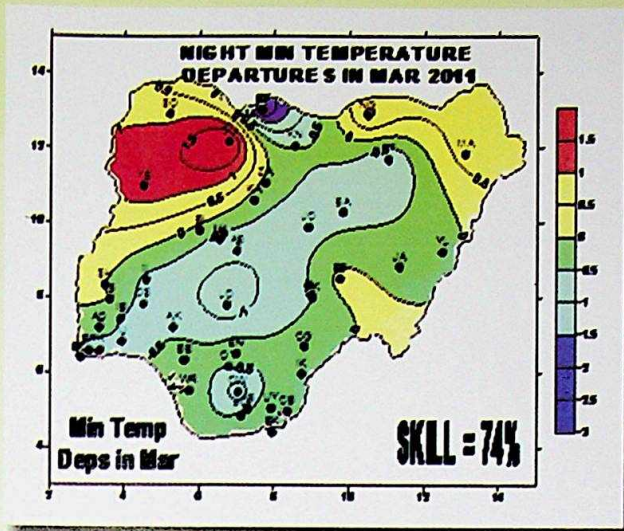
TEMPERATURES

DAY TIME MAXIMUM TEMP



NIGHT TIME MINIMUM TEMP

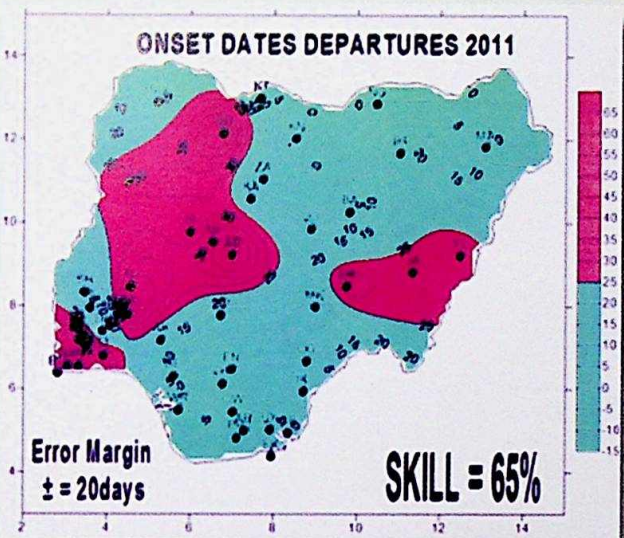




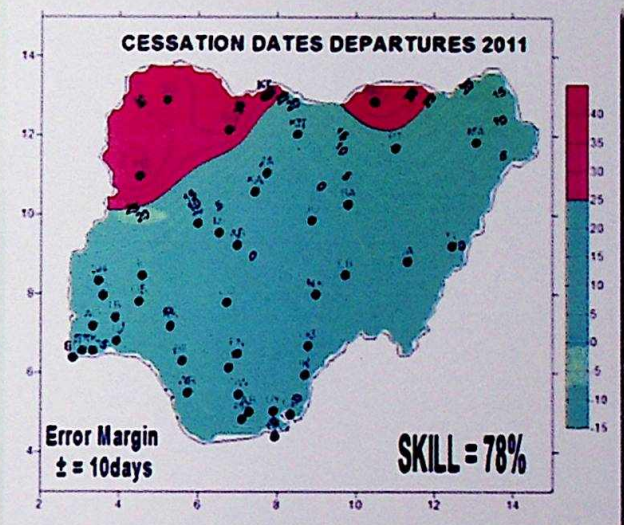
RAINFALL

ONSET, CESSATION, LENGTH OF RAINY SEASON & SEASONAL RAINFALL AMOUNT EVALUATIONS

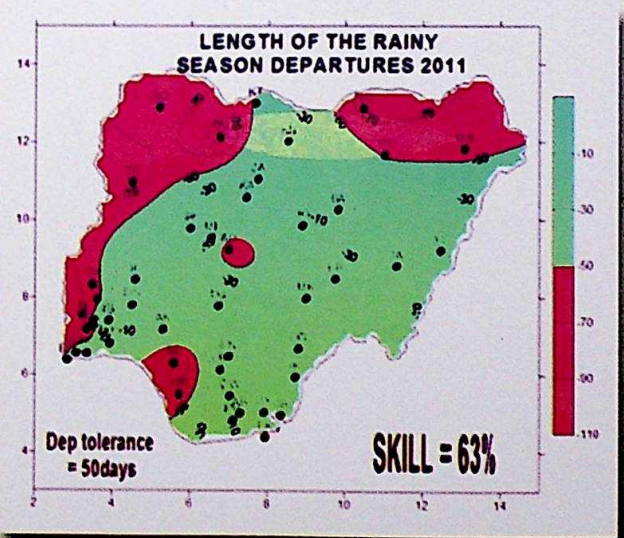
ONSET DATES



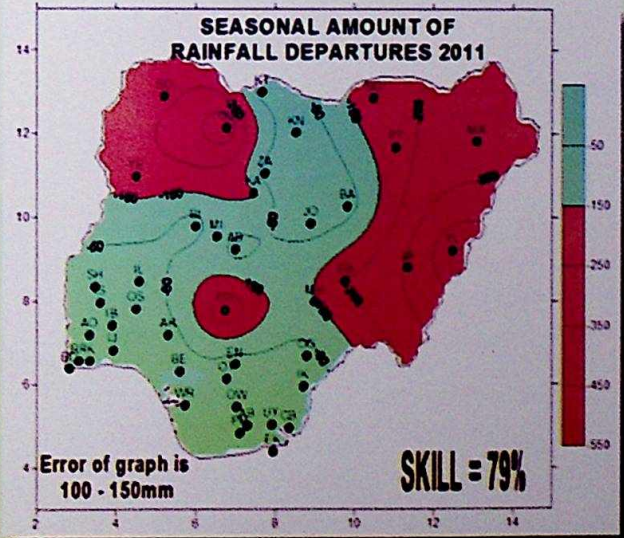
CESSATION DATES



LENGTH OF RAINY SEASON



SEASONAL AMOUNT OF RAINFALL



Please note that the evaluation was done with stations as point objects on Nigeria's map

2012 SEASONAL RAINFALL PREDICTION

1.0 TEMPERATURE PREDICTIONS FOR JANUARY-APRIL 2012

1.1 JANUARY 2012

In January 2012, the forecast suggests that minimum temperature (night) and maximum temperature (day) would be colder than normal as shown in Figs. 1a & 1b. NIMET advises that livestock which normally reside outside should be protected from cold temperatures.

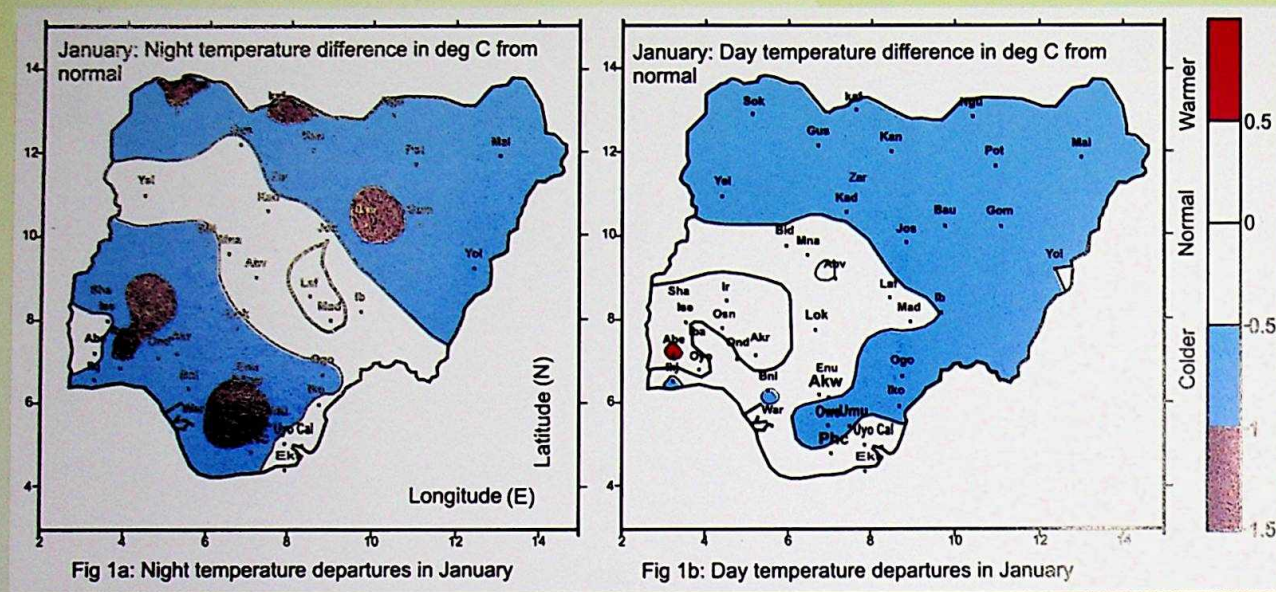


Fig 1a: Night temperature departures in January

Fig 1b: Day temperature departures in January

1.2 FEBRUARY 2012

In February, both night and day temperatures are expected to be colder than normal particularly in the south of the country. Heat-induced ailments such as measles and meningitis will therefore be less prevalent.

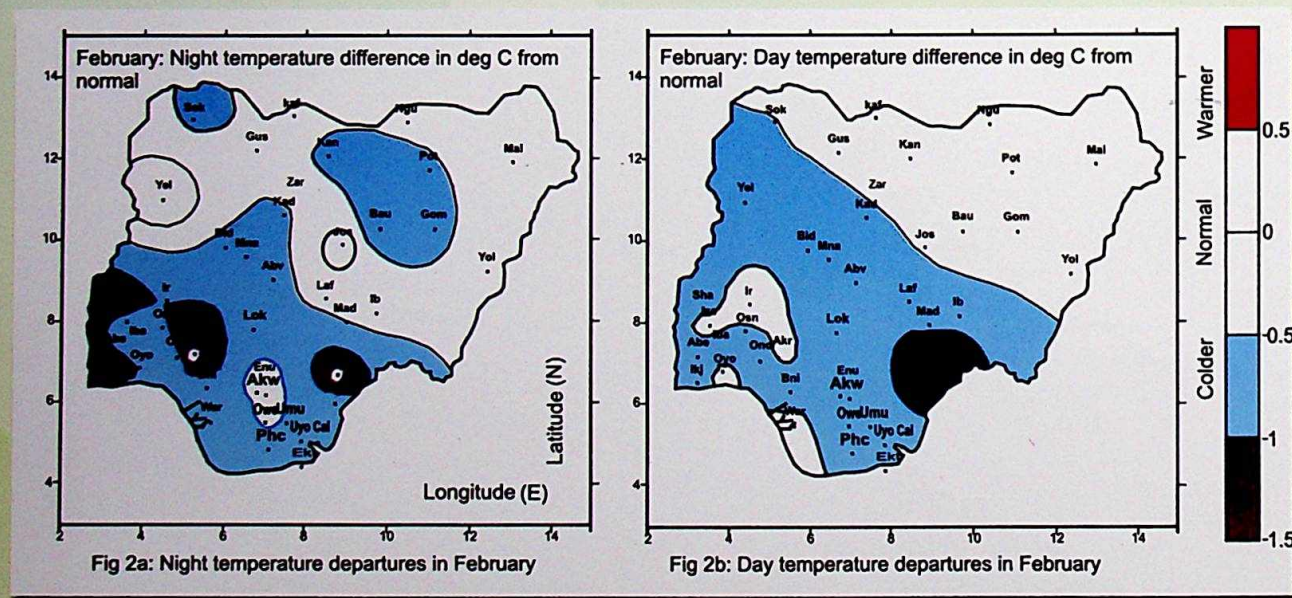
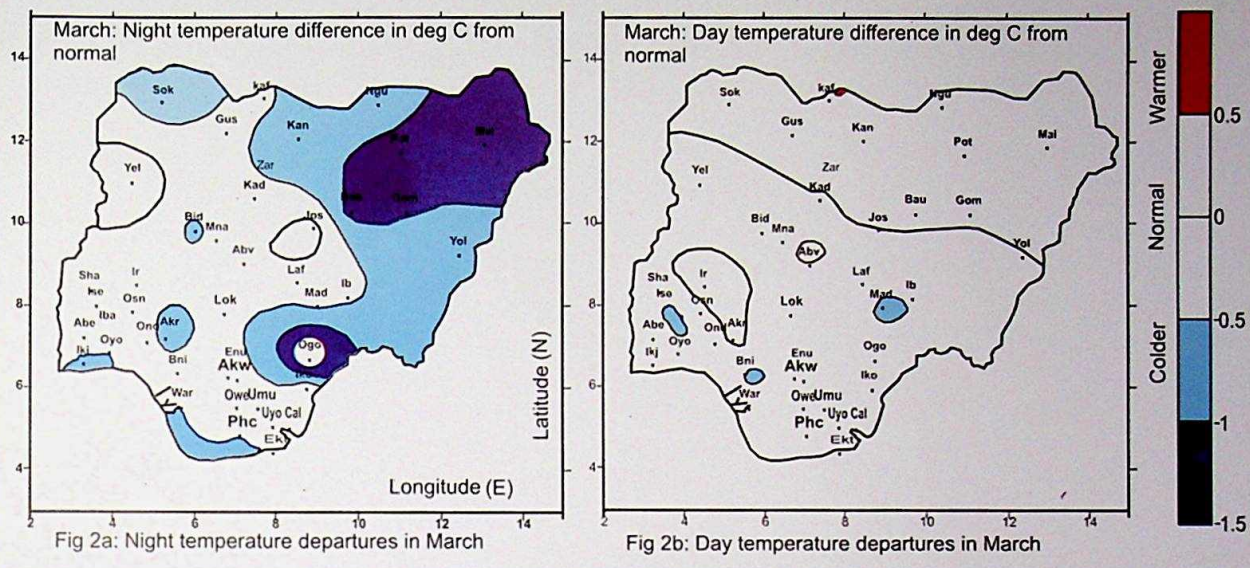


Fig 2a: Night temperature departures in February

Fig 2b: Day temperature departures in February

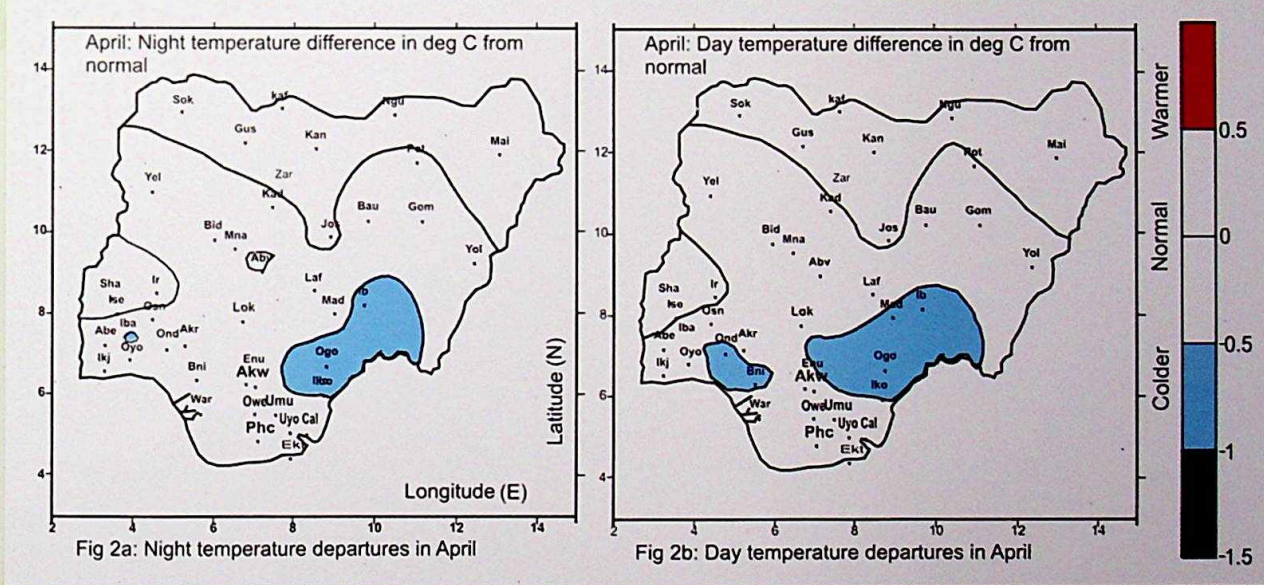
1.3 MARCH 2012

Nights are likely to be colder than normal in March, particularly in the northeast corner of the country. Day time temperatures are expected to get warmer in the south while that trend won't be felt in the rest of the country. After a colder than normal February, day-time temperatures are expected to return to normal over a greater part of the country.



1.4 APRIL 2012

April temperature pattern will be mainly normal as a result of the end of the harmattan season all over the country.



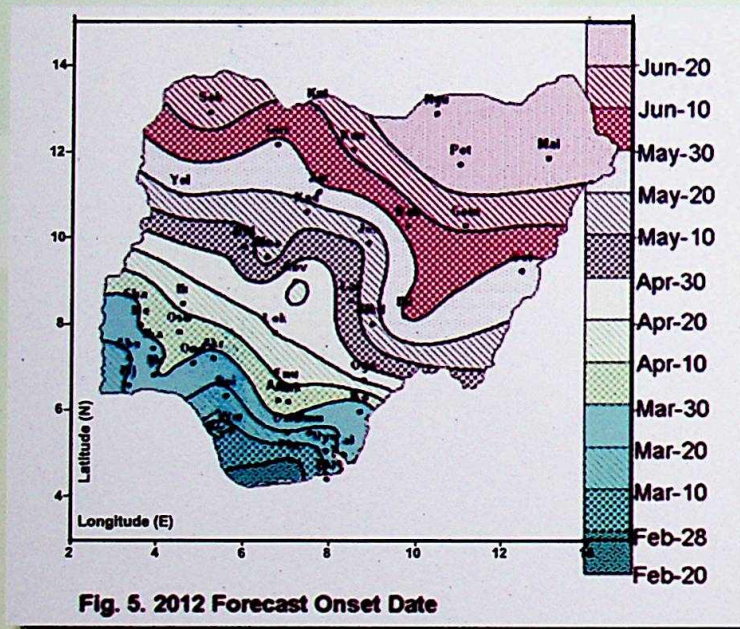
2.0 RAINFALL PREDICTION FOR 2012

2.1 ONSET OF THE GROWING SEASON (ONSET)

In an agrarian economy like Nigeria, where agriculture almost entirely depends on rainfall, the timing of rainfall is indispensable to agriculture for the commencement of growing season. It affects establishment of crops, agricultural production and eventually regional economies. A failure in the early establishment of rainfall onset usually affects farmers negatively in Nigeria. That is why farmers in Nigeria have

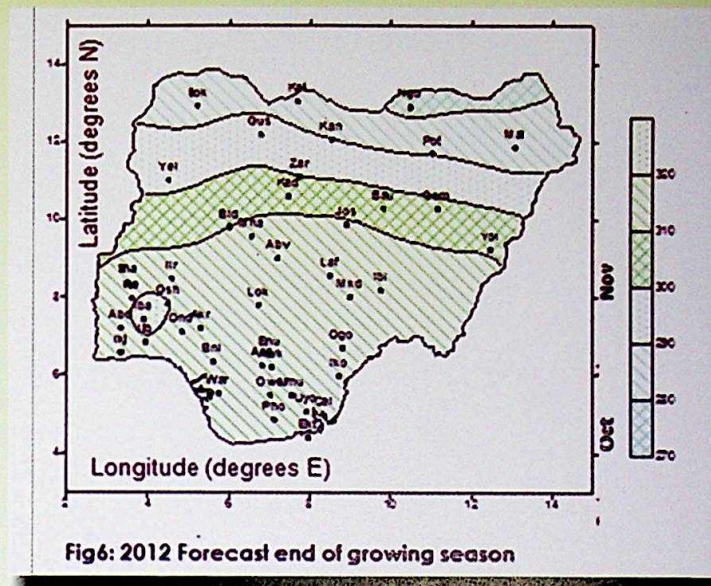
identified the onset date as the single most desirable piece of forecast information. From farmer's perspectives, *it is essential that, after a given date, the rain will become fairly continuous and sufficient to ensure adequate soil moisture for and after planting is maintained as the season advances for successful establishment of crops. Therefore, onset identification was based on a daily analysis of the soil water balance depending upon which crop was planted first at the location of analysis* (Table 1). The analysis focused over the initial establishment stage by identifying and quantifying the risk of crop failure. A combination of historical daily weather data from about 20-ENSO-neutral years at 38-synoptic stations spatially distributed over Nigeria and soil water balance for crops were used for 2012 forecast.

Experience over the years has shown that rainfall onset can be reliably predicted using ENSO-phase specific rainfall analysis and crop simulation models using day-to-day soil moisture analysis. Using this proven methodology, in 2012, Nigeria is expected to have rainfall onset between February 20 and late June as illustrated in Fig 5. *A normal (Changes within 10 days) onset of rains in 2012 in the country is predicted.* However, there may be few deviations from the above, as the remnants of the weak – moderate La-Nina currently being experienced during this first quarter of the year is expected to bring in early rains in some parts of the country. Expectedly, these early rains will be accompanied by thunderstorms and destructive strong winds during the period. Therefore farmers need to be prepared to sow their crops early. Judicious use of these predictions in planning cropping activities will lead to safe sowing and enhanced crop and food production. This information should be made widely available to extension services and agencies that have the responsibility of advising farmers on appropriate time of planting and varieties to be planted.



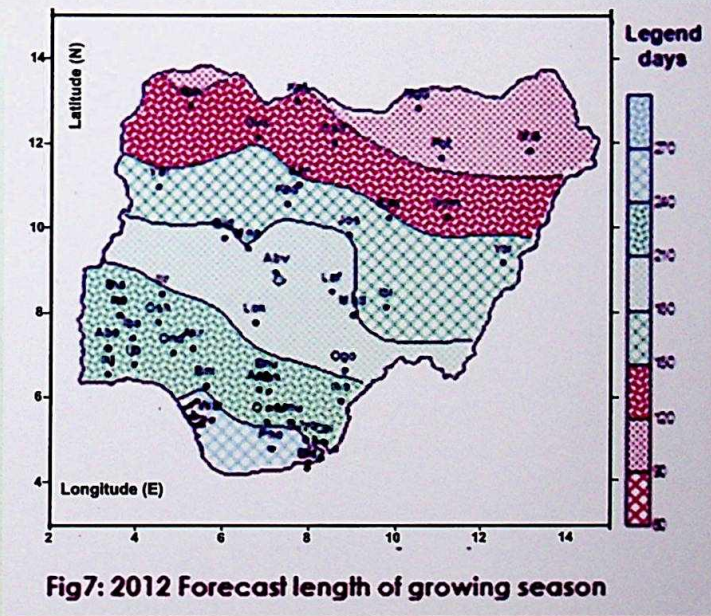
2.2 END OF GROWING SEASON (CESSATION)

Rainfall cessation period is crucial in Nigeria since it affects both non-irrigated agricultural production and irrigation demand from dry-season crops. Cessation date (Table 1) calculation was based on a daily analysis of the soil water balance calculated using appropriate crop model by quantifying when the available water content of the root zone during crop maturation goes down to 50%. *In 2012, the cessation period is predicted to be between October and November over the country.*



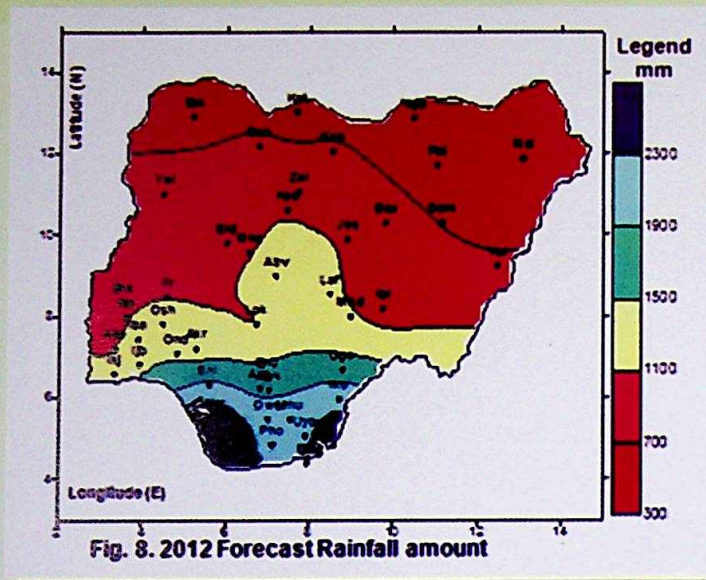
2.3 LENGTH OF GROWING SEASON

The length of growing season for 2012 was obtained from the difference between forecast onset and cessation dates. *The length of growing season is predicted to be between 90 and 270 days.* Fig 7 and Table 2 should be used to determine the spatial extent of these changes in various parts of the country. Because of the forecast of a normal length of growing season, it is of utmost importance that planting of longer season crops is minimized. Crops need to be planted as soon as favourable conditions are established as *guided by the planning map (fig 7) and Table 2.* In areas of shorter rainy season farmers should consider short season varieties instead of later maturing varieties.



2.4 SEASONAL RAINFALL AMOUNT

The *growing season is defined as the period between the onset and cessation dates of rain in each part of the country.* Considerable variations in seasonal rainfall over the country are expected as shown in the fig 8. The seasonal rainfall is expected to vary from 300-1100mm in the northern half of the country. In the South, this will rapidly increase from 1200 – 2700mm, which may lead to high surface runoff and flash flooding. *Predicted 2012 rainfall values tend to be normal (-5% to 5%) over large area of the country.* This is likely to create sufficient water in lakes, dams and rivers, for both hydroelectric power generations as well as for irrigation.



3.0 SOCIO-ECONOMIC IMPACTS OF 2012 RAINFALL & TEMPERATURES:

With the *predicted 'normal growing season'* in most parts of the country in 2012, some rainfall-sensitive socio-economic activities are likely to be affected especially the rain-fed agricultural production sector. The expected consequences in this sector and other key socio-economic sectors as well as recommended coping strategies are stated below.

3.1 AGRICULTURE

3.1.1 CROPS

The predicted 'normal growing season' in 2012 is expected to result in good agricultural yields, with little chance of Agricultural drought across the country. In order to take maximum advantage of the good rainfall predicted this year as well as reduce impact of quela birds invasion in these areas, farmers are advised to source and undertake early planting of improved high-yielding varieties of seeds, cuttings and seedlings for all crops commonly grown in the country. These include maize, millet, sorghum, rice, soya bean, cowpeas, groundnut, yam, cassava, sweet and Irish potatoes. In addition, they should obtain access to credit before the start of the planting season to ensure availability of other relevant farm inputs and services such as fertilizers, agro-chemicals and tractors. The necessary supports from Governments at all levels are therefore highly recommended to facilitate timely and cheaper supplies of the various improved crop varieties and other farm inputs and services including incentives to farmers and other agro-allied operators.

High agricultural yields are likely over the savannah regions as a result of adequate rainfall expected over the area. For the southern region where adequate rainfall is also expected during the season, good cereal and root crop yields are likely. Farmers in this region and the central part of the country should plant tuber crops immediately the predicted dates are attained. However, they are advised to harvest and store the tubers promptly in order to avoid the attendant problem associated with delayed harvest in such weather conditions. They should also use other artificial methods of drying to preserve the produce since drying through the sun may not be very effective. Government is equally advised to be proactive in the provision of adequate storage facilities and processing capability.

3.1.2 LIVESTOCK

The predicted normal rainfall will favour good livestock production during the year. Judicious use of the rainfall is however highly recommended to ensure effective management of range and pastureland. This will facilitate production of fodder to be stored against the dry season (drought period) thus prevent

escalation of conflict between farmers and cattle rearers. Rain harvesting in form of field ponds should be encouraged especially in the north in order to avoid early livestock water starvation. There is also need for Governments at all levels to make timely provisions of other necessary livestock inputs like improved breeds, feeds and vaccines in order to harness the expected high livestock production potential during the season.

3.1.3 PEST AND DISEASES

Farmers in the extreme northern parts of the country and environs are likely to face attacks of grasshoppers (desert locust), flower-feeding insects, millet head miners and grain-eating birds (quela birds) and other environmental related crop diseases. The necessary measures to address such threats should therefore be put in place by the relevant agricultural extension services.

3.2 COASTAL AND MARITIME SECTOR

The implication of the expected normal to above normal rainfall for this sector is the likelihood of sufficient fish production in the country. On the other hand, there is possibility of rainstorms and gustiness that could aggravate intensity of associated coastal flooding and erosion, which may result in landslide and loss of lives and properties. The necessary awareness therefore needs to be created among the relevant Government agencies to ensure adequate emergency preparedness in the event of casualties from associated climate hazards.

3.3 HYDROLOGY AND WATER RESOURCES

For the water-allied socio-economic sectors, particularly the hydro-energy sector, the expected normal rainfall portends good prospects for the various hydrological areas of the country. However, hydrological and water resources managers are advised to note the likely varying degrees in the impacts over the respective hydrological regions and plan accordingly. Dam managers should ensure efficient and early release of water from dams to accommodate run-offs.

3.4 TRANSPORTATION SECTOR

Expected impacts of the predicted rainfall pattern and associated severe rainstorms and strong winds which will occur in isolated areas include poor visibility and slippery roads. The necessary control measures by the relevant Government agencies such as the Federal Road Safety Corps (FRSC) need to be put in place to ensure reduction of the attendant road accidents at such periods. In addition, the public and the police are advised to be more cautious and vigilant, as scientific findings show that the activities of hoodlums and vehicle theft usually increase during such periods. The use of fog lights by motorists during periods of reduced visibility should also be encouraged to avoid accidents.

3.5 DISASTER MANAGEMENT

The predicted normal rainfall may result in flash flooding particularly in the northern states. It should also be noted that wet spells and flash floods could occur even in areas with a likelihood of near normal to below normal rainfall. Such flash floods may lead to physical damage to crops in the field, agricultural equipment and structures (e.g. dams), as well as physical damage to infrastructure – roads, railway lines, telecommunication networks, etc. Also, loss of lives and displacement of large populations due to disruption of agricultural activities as a result of extreme weather is very likely.

In addition, the below normal temperature predicted over most regions of the country early in the year makes the environment less susceptible to fire outbreak. Therefore, the Emergency Management Services are advised to take advantage of these advisories and strengthen their preparedness.

3.6 HEALTH

Though there are likely incidences of increased air-borne diseases as a result of the harmattan dust haze early in the year, the predicted below normal temperature during the season may prevent heat waves. This may in turn reduce occurrence of meningitis over such places and make malaria parasites more active. Therefore, the health services sector should take advantage of this advisory to strengthen their contingency preparedness plans.

4.0 RAINFALL PREDICTION TABLES FOR 2012

Table 1. A detailed station-by-station analysis of rainfall onset, cessation, and length along with total seasonal rainfall expected in 2012 and their margin of errors (ME).

Station	Onset		End Of Season		Length of Season		Seasonal Rainfall	
	Likely	ME Days	Likely	ME Days	Likely	ME Days	Likely	ME mm
	ABE	15-Mar	3	4-Nov	2	235	3	1035
ABU	13-Apr	5	5-Nov	3	217	6	1424	44
AKU	25-Mar	3	13-Nov	2	234	3	1284	60
BAU	2-Jun	4	31-Oct	2	152	4	886	39
BEN	15-Mar	3	10-Nov	0	241	3	1985	94
BID	1-May	3	5-Nov	3	188	5	995	42
CAL	30-Mar	2	11-Nov	3	227	3	2635	86
ENU	8-Apr	3	9-Nov	0	217	3	1693	50
GUS	26-May	1	22-Oct	2	150	2	811	43
IBA	26-Mar	3	27-Nov	3	246	4	1275	64
IBI	2-Jun	2	12-Nov	2	163	2	874	37
IJE	3-Apr	2	12-Nov	0	223	2	1395	53
IKE	22-Mar	4	12-Nov	2	236	5	1279	50
IKO	15-Mar	5	10-Nov	0	241	5	2218	55
ILO	12-Apr	4	9-Nov	2	212	5	1095	40
ISE	5-Apr	4	13-Nov	1	223	4	1069	38
JOS	9-May	0	7-Nov	2	183	2	1057	31
KAD	12-May	1	31-Oct	2	174	3	1082	48
KAN	10-Jun	4	16-Oct	2	129	4	799	68
KAT	20-Jun	4	10-Oct	2	126	4	462	38
LOK	21-Apr	4	5-Nov	1	200	4	1040	37
MAI	26-Jun	2	10-Oct	2	107	3	430	34
MIN	20-May	3	9-Nov	2	174	4	1046	36
NGU	30-Jun	3	3-Oct	2	93	4	336	23
OGO	24-Apr	4	8-Nov	0	199	4	1675	68
OND	30-Mar	3	3-Nov	9	220	11	1405	92
ONI	8-Apr	2	9-Nov	0	215	2	1740	41
OSG	3-Apr	2	16-Nov	1	228	3	1227	45
OWE	22-Mar	4	9-Nov	1	233	5	2233	70
POR	24-Feb	5	11-Nov	0	263	5	2131	44
POT	23-Jun	3	16-Oct	2	113	4	494	29
SHA	24-Mar	3	11-Nov	2	233	3	1047	49
SOK	15-Jun	3	12-Oct	1	120	3	522	22
UYO	9-Mar	6	5-Nov	5	242	6	2061	91
WAR	7-Mar	2	8-Nov	2	247	4	2649	67
YEL	20-May	2	23-Oct	1	157	2	883	39
YOL	24-May	4	5-Nov	1	166	3	742	27
ZAR	29-May	2	26-Oct	2	151	3	860	26

Table 2. A detailed town -by-town results of rainfall onset, cessation, and length along with total seasonal rainfall expected in 2012 and their margin of errors.

State	City	Long Degrees	Lat Degrees	Onset date	Season end	Season Length Days	Season Rainfall mm
				Margin of error	Margin of error	Margin of error	Margin of error
				1-6 Days	1-9 Days	2-11 Days	22-94mm
Abia	Aba	7.35	5.10	9-Mar	7-Nov	254	2251
	Umuahia	7.48	5.52	14-Mar	9-Nov	247	2072
Adamawa	Michika	13.43	10.70	22-May	29-Oct	157	717
	Mubi	13.25	10.27	16-May	1-Nov	165	770
	Yola	12.45	9.23	24-May	5-Nov	166	742
	Jada	12.10	8.72	26-Apr	9-Nov	191	1049
Akwa Ibom	Eket	7.95	4.40	28-Feb	4-Nov	266	2572
	Ikot Ekpene	7.70	5.18	10-Mar	8-Nov	252	2216
	Uyo	7.92	5.05	9-Mar	5-Nov	242	2061
	Iniara	6.30	5.30	11-Mar	8-Nov	250	2164
Anambra	Onitsha	6.78	6.15	8-Apr	9-Nov	215	1740
	Awka	7.07	6.20	23-Mar	11-Nov	235	1804
	Bauchi	9.82	10.28	2-Jun	31-Oct	152	886
Bauchi	Azare	10.17	11.67	4-Jun	20-Oct	141	639
	Alkali	10.25	10.32	17-May	31-Oct	164	763
	Yenagoa	6.25	4.92	6-Mar	6-Nov	257	2331
Bayelsa	Nembe	6.37	4.48	29-Feb	4-Nov	264	2534
	Brass	6.25	4.30	27-Feb	3-Nov	268	2620
	Gboko	9.02	7.32	7-Apr	11-Nov	216	1422
Benue	Makurdi	9.00	8.00	16-Apr	11-Nov	204	1227
	Oturkpo	8.13	7.18	5-Apr	11-Nov	218	1466
	Biu	12.18	10.58	21-May	30-Oct	159	731
Borno	Maiduguri	13.08	11.85	26-Jun	10-Oct	107	430
	Kukawa	12.92	13.57	29-Jun	28-Sep	108	645
	Cross River	Calabar	8.35	4.97	30-Mar	11-Nov	227
Ikom		8.72	5.97	15-Mar	10-Nov	241	2218
Ogoja		8.80	6.70	24-Apr	8-Nov	199	1675
Delta	Asaba	6.82	6.23	24-Mar	11-Nov	234	1793
	Sapele	5.88	5.67	16-Mar	9-Nov	244	2010
	Warri	5.73	5.52	7-Mar	8-Nov	247	2649
Ebonyi	Abakaliki	6.33	8.08	17-Apr	10-Nov	202	1205
	Afikpo	5.88	7.91	15-Apr	11-Nov	205	1251
Edo	Benin	5.60	6.33	15-Mar	10-Nov	241	1985
	Auchi	6.25	7.07	4-Apr	11-Nov	220	1501
Ekiti	Ado Ekiti	7.60	5.20	10-Mar	8-Nov	252	2207
	Ikere Ekiti	7.50	5.22	10-Mar	8-Nov	252	2199
	Ilawe Ekiti	7.37	5.05	8-Mar	7-Nov	255	2273
Enugu	Enugu	7.00	6.50	8-Apr	9-Nov	217	1693
	Nsukka	7.38	6.85	1-Apr	11-Nov	224	1574
	Awgu	7.47	6.07	22-Mar	10-Nov	237	1853

State	City	Long	Lat	Onset date	Season end	Season Length Days	Season Rainfall mm
		Degrees	Degrees	Margin of error 1-6 Days	Margin of error 1-9 Days	Margin of error 2-11 Days	Margin of error 22-94mm
Gombe	Gombe	11.17	10.27	16-May	1-Nov	165	770
	Nafada	11.32	11.1	27-May	26-Oct	151	678
Imo	Okigwe	7.35	5.83	18-Mar	10-Nov	241	1946
	Owerri	7.03	5.48	22-Mar	9-Nov	233	2233
Jigawa	Gumel	9.37	12.62	17-Jun	10-Oct	124	616
	Hadejia	10.03	12.42	14-Jun	13-Oct	128	616
	Dutse	9.33	11.8	6-Jun	19-Oct	138	633
Kaduna	kaduna	7.45	10.6	12-May	31-Oct	174	1082
	Kafanchan	8.28	9.57	7-May	5-Nov	177	878
	Zaria	7.75	11.07	29-May	26-Oct	151	860
Kano	Kano	8.53	12.05	10-Jun	16-Oct	129	799
	Gaya	9	11.83	6-Jun	19-Oct	138	631
	Rano	8.57	11.53	2-Jun	22-Oct	143	647
Katsina	Funtua	7.3	11.52	2-Jun	22-Oct	143	647
	Katsina	7.68	13.02	20-Jun	10-Oct	126	462
	Daura	8.3	13	22-Jun	6-Oct	118	621
	Musawa	7.67	12.11	10-Jun	16-Oct	133	621
Kebbi	Jega	4.43	12.2	11-Jun	15-Oct	132	619
	Argungu	4.52	12.72	18-Jun	9-Oct	123	616
	Birnin Kebbi	4.2	12.43	14-Jun	12-Oct	128	616
	Yelwa	4.5	11	20-May	23-Oct	157	883
Kogi	Lokoja	6.73	7.8	21-Apr	5-Nov	200	1040
	Okene	6.22	7.55	10-Apr	11-Nov	212	1353
	Idah	6.72	7.1	4-Apr	11-Nov	219	1492
Kwara	Ilorin	4.58	8.48	12-Apr	9-Nov	212	1095
	Lafiaji	6.52	9.08	1-May	7-Nov	185	972
	Offa	4.7	8.12	18-Apr	10-Nov	202	1195
Lagos	Ikeja	3.33	6.58	22-Mar	12-Nov	236	1279
	Ikorodu	3.5	6.6	29-Mar	11-Nov	228	1659
	Badagry	2.88	6.37	26-Mar	11-Nov	232	1741
Nasarawa	Lafia	8.47	8.5	23-Apr	9-Nov	195	1100
	Akwanga	8.9	8.4	22-Apr	10-Nov	197	1124
	Keffi	7.87	8.83	27-Apr	8-Nov	190	1024
Niger	Kontogora	5.45	10.4	18-May	31-Oct	163	753
	Minna	6.54	9.56	20-May	9-Nov	174	1046
	Bida	6	9.8	1-May	5-Nov	188	995
Ogun	Ijebu-Ode	3.93	6.83	3-Apr	12-Nov	223	1395
	Abeokuta	3.33	7.2	15-Mar	4-Nov	235	1035
	Sagamu	3.63	6.83	1-Apr	11-Nov	224	1580
Ondo	Akure	5.3	7.2	25-Mar	13-Nov	234	1284
	Ondo	4.83	7.1	30-Mar	3-Nov	220	1405
	Owo	5.58	7.18	5-Apr	11-Nov	218	1466
Osun	Ila	4.9	8	16-Apr	11-Nov	204	1227
	Oshogbo	4.5	7.82	3-Apr	16-Nov	228	1227
	Ilesa	4.73	7.62	11-Apr	11-Nov	210	1333
Oyo	Shaki	3.47	8.35	24-Mar	11-Nov	233	1047
	Iseyin	3.6	7.97	5-Apr	13-Nov	223	1069
	Ibadan	3.9	7.43	26-Mar	27-Nov	246	1275
Plateau	Jos	8.9	9.87	9-May	7-Nov	183	1057
	Bokkos	9.28	8.98	29-Apr	8-Nov	187	992
	Pankshin	9.3	9.43	5-May	6-Nov	179	904

Table 2 (Continue). A detailed town-by-town results of rainfall onset, cessation, and length along with total seasonal rainfall expected in 2012 and their margin of errors.

State	City	Long	Lat	Onset date	Season end	Season Length Days	Season Rainfall mm
		Degrees	Degrees	Margin of error	Margin of error	Margin of error	Margin of error
				1-6 Days	1-9 Days	2-11 Days	22-94mm
Rivers	Phc	7.12	4.85	24-Feb	11-Nov	263	2131
	Opobo	7.55	4.62	2-Mar	5-Nov	262	2468
	Bonny	7.15	4.42	29-Feb	4-Nov	265	2562
Sokoto	Gada	5.65	13.73	1-Jul	26-Sep	105	656
	Lema	4.22	12.93	21-Jun	7-Oct	119	619
	Sokoto	5.2	12.92	15-Jun	12-Oct	120	522
Taraba	Ibi	9.73	8.17	2-Jun	12-Nov	163	874
	Wukari	9.77	7.87	14-Apr	11-Nov	206	1262
	Gembu	11.25	6.7	30-Mar	11-Nov	226	1625
Yobe	Nguru	10.47	12.88	30-Jun	3-Oct	93	336
	Potiskun	11.03	11.7	23-Jun	16-Oct	113	494
	Damaturu	11.75	11.95	8-Jun	18-Oct	136	626
Zamfara	Gummi	5.1	12.13	10-Jun	16-Oct	133	621
	Talata Mafara	6.07	12.55	16-Jun	11-Oct	126	615
	Gusau	6.77	12.17	26-May	22-Oct	150	811
FCT	Abuja	7	9.25	13-Apr	5-Nov	217	1424
	Kwali	6.98	8.85	28-Apr	8-Nov	189	1020
	Karshi	7.55	8.82	27-Apr	8-Nov	190	1027

CONTACT DETAILS FOR NIMET STATIONS NATIONWIDE

S/N	STATE	STATION	CONTACT PERSON	GSM No.
1	Abia	Umuahia	Ufot O. O.	08068183876
2	Akwa Ibom	Uyo	Akpan I. J.	08037609960, 08026394336
3	Adamawa	Yola	Buba Sule	08058368711
4	Anambra	Awka	Omenikolo F.C.	08036148836
5	Bauchi	Bauchi	Adenigbo S. O.	08054968140, 08036277475
6	Bayelsa	Yenagoa	Uriah W. N.	08028693332, 08038822237
7	Benue	Makurdi	Iwuoha N. C.	08060205863, 08053298064
8	Bornu	Maiduguri	Zakari Ya'u A. D.	08057564406, 08028267295
9	Cross River	Calabar	Effiong E. O.	08023832965, 08054968133
10		Ikom	Ikara A. B.	07035397567
11		Ogoja	Jacob J. S.	08037606649
12		Eket	Ayi B. U.	07031975139
13		Bebi	Akpauo J. A.	08076235272
14	Delta	Asaba	Osawaru K.	08023311111
15		Warri	Idahagbon J. I.	08078706259, 08052230245
16	Ebonyi	Abakaliki	Nwachukwu S. O.	08069426580
17	Edo	Benin	Mmumu E. E.	08054968132, 08077884077
18	Ekiti	Ado-Ekiti	Olatunji M. A. Mrs	08034257790, 08058742053
19	Enugu	Enugu	Nwoko I. I.	08050871756, 08031344699
20	FCT	Abuja	Osague C. G.	08055419640, 07055861583
21	Gombe	Gombe	Abasi E. E.	08059534934, 08036231223
22	Imo	Owerri	Osakwe M. N. Mrs.	08054950089, 08065518281
23	Jigawa	Dutse	Noah J. O.	08036820716

24	Kaduna	Kaduna	Bello S. E. Mrs.	08054968130, 08066434454
25		Zaria	Eshiemiakhe F. I.	08051792290
26	Kano	Kano	Ibrahim I.	08059424299, 08023005928
27	Katsina	Katsina	Eyah G. M.	08032656396, 08054968137
28	Kebbi	B/Kebbi	Salami A. O.	08036208810
29		Yelwa	Abdulahi M. K.	08067990231
30	Kwara	Ilorin	Ojediran D. J	08033859232, 08081425192
31	Kogi	Lokoja	Osunlalu O. A.	08036820685
32	Lagos	Oshodi	Ngana D. T.	08023052053
33		Ikeja	Iso M. O. Mrs.	08023005890
34		Marine	Edafienene L. E.	08023213456
35	Niger	Minna	Udezo E. O.	08077185673
36		Bida	Ojo J. O.	08060284166
37	Nasarawa	Lafia	Nsemoh E. O.	08036424397
38	Ogun	Abeokuta	Ogunleye A. D.	08030744721
39		Ijebu Ode	Alebiosu	08122708242
40	Ondo	Akure	Omojuyigbe R. B.	08065989345
41		Ondo	Apotiola J.	08081003861
42	Osun	Oshogbo	Adenle J. O.	08032900145, 08054944137
43	Oyo	Ibadan	Ajisafe M. A.	08051040999, 07030575399
44		Iseyin	Okunola J. A.	08034813305
45		Shaki	Bolaji F. O.	08076563168
46	Plateau	Jos	Ihekandu C. C.	08054415845
47	Rivers	Port Harcourt	Chigbu J. O.	08033677744
48	Sokoto	Sokoto	Limis I. M.	08035678997
49	Taraba	Jalingo	Kazzah A. D	08029135800
50		Ibi	Samuel E. I.	08022059725
51	Yobe	Damaturu	Peters H. K.	08036851974
52		Nguru	Garba A.	08064982659
53		Potiskum	Moses John	07037624162
54	Zamfara	Gusau	Maiwurno A. S.	07068265367

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THE DIRECTOR GENERAL/CEO
NIGERIAN METEOROLOGICAL AGENCY (NIMET)
33 Pope John Paul II Street, Off Gana Street, Maitama, Abuja
Tel: +234 9 4130709, 4130711, Fax: +234 9 4130710